

Application No. 10/047,122
Amendment dated June 29, 2004
Reply to Office Action of December 30, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-5. (cancelled).

6. (previously presented) A method for aspirating material from an animal or human body cavity, the method comprising the steps of:

 inserting an instrument adapted to manipulate the tissue through the body cavity, the instrument having a passage therein;

 suctioning fluid from the tissue through the passage of the instrument; and
 dilating the cavity to remove tissue that is unable to fit completely within a cannula without substantial compression of the tissue.

7. (original) The method of claim 6, further comprising the step of grasping the tissue with the instrument to remove the tissue from the cavity.

8. (original) The method of claim 6, further comprising the step of treating the tissue to at least partially dissolve the tissue or any contents in the tissue.

9. (original) The method of claim 8, wherein the treating step includes the sub-step of treating the tissue with methyl tert-butyl ether.

10. (original) The method of claim 6, further comprising the step of inserting a cannula into the cavity, the cannula having a lumen adapted to accept the instrument.

11. (original) The method of claim 8, wherein the treating step is performed through the passage of the instrument.

Claim 12. (cancelled).

13. (previously presented) The method of claim 6, wherein the dilating step is performed by the instrument.

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14. (original) The method of claim 13, wherein the instrument is a surgical extractor having a dilator.
15. (original) The method of claim 6, wherein the suctioning step includes the step of suctioning bile from a gall bladder.
16. (original) The method of claim 6, wherein the inserting step includes the step of inserting a cannula having a maximum diameter in the range of 3 mm to 5 mm.
17. (original) The method of claim 6, further comprising the step of removing the tissue from the cavity.
18. (previously presented) A method for removing tissue from an animal or human body cavity that is unable to fit completely within a cannula without substantial compression, the method comprising the steps of:
 - inserting the cannula into the cavity;
 - inserting a dilator having a leading end through the cannula;
 - expanding the leading end of the dilator to an expanded position;
 - inserting a grasper through the dilator;
 - grasping the tissue with the grasper;
 - moving the tissue with the grasper into the dilator; and
 - removing the cannula and the dilator together with the dilator remaining substantially in the expanded position.
19. (original) The method of claim 18, further comprising step of retaining the tissue within the expanded leading end of the dilator.
20. (previously presented) The method of claim 18, wherein the step of removing includes removing the dilator having a generally conical shape in the expanded position.
21. (original) The method of claim 18, further comprising the step of suctioning fluid or other material from the tissue.
22. (original) The method of claim 21, wherein the suctioning step includes the step of suctioning bile or other material from a gall bladder.

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23. (original) The method of claim 18, wherein the leading end of the dilator includes a draw cable for drawing in the leading end of the dilator, further comprising the step of pulling the draw cable to draw in the leading end of the dilator.

Claim 24. (cancelled).

25. (original) The method of claim 18, wherein the step of inserting the cannula includes inserting a cannula having a maximum diameter in the range of 3 mm to 5 mm.
26. (previously presented) A surgical tool set for removing tissue from an animal or human body cavity, said tool set comprising:

a surgical extractor dilator having a leading end, a trailing end, a length therebetween, and a lumen between the leading and trailing ends, said leading end having a dilator movable between an unexpanded position and an expanded position;

a grasper insertable within said lumen of said surgical extractor dilator, said grasper having a leading end with grasping surfaces, a trailing end with a handle, and a lumen between the leading and trailing ends, said lumen of said grasper adapted to permit the passage of a surgical instrument therethrough, said grasper having a length greater than the length of said surgical extractor dilator; and

an elongated needle adapted to be inserted within said lumen of said grasper, said needle having a length sufficient to extend beyond a distal end of said grasper.

Claim 27. (cancelled).

28. (previously presented) The surgical tool set of claim 26, wherein said needle is adapted to be connected to a syringe.
29. (previously presented) The surgical tool set of claim 26, wherein said needle is adapted to be connected to an aspirator.

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30. (original) The surgical tool set of claim 26, further comprising a cannula for providing protected access to a surgical site, said cannula having a leading end, a trailing end, a length therebetween, and a lumen between the leading and trailing ends adapted to permit passage of said surgical extractor dilator therethrough.
31. (original) The surgical tool set of claim 30, wherein said cannula has a maximum outer diameter less than 10 mm.
32. (original) The surgical tool set of claim 31, wherein said cannula has a maximum outer diameter in the range of 3 mm to 5 mm.
33. (original) The surgical tool set of claim 26, further comprising at least one seal oriented within said lumen of said surgical extractor dilator configured to permit the passage of said grasper therethrough while inhibiting a loss of pressure from within the body cavity after said surgical extractor dilator is inserted in the patient.
34. (original) The surgical tool set of claim 33, wherein said at least one seal has a through-hole smaller than the maximum cross sectional dimension of said grasper.
35. (previously presented) A surgical extractor for removing tissue from an animal or human body cavity, the extractor comprising:
 - a body having a leading end, a trailing end, a longitudinal axis, and a lumen between said leading and trailing ends;
 - a dilator at the leading end of said body being movable between an unexpanded position and an expanded position, said dilator having an inner surface; and
 - tissue retaining protrusions on said inner surface of said dilator, said tissue retaining protrusions being uniformly spaced around the longitudinal axis of said body and being configured to generally point towards said trailing end of said body when said dilator is in the expanded position.

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36. (original) The surgical extractor of claim 35, wherein said tissue retaining protrusions are teeth.

Claim 37. (cancelled).

38. (original) The surgical extractor of claim 35, wherein said tissue retaining protrusions are spaced substantially about the entire area of said inner surface.

39. (previously presented) A surgical extractor for removing tissue from an animal or human body cavity, the extractor comprising:

 a body having a leading end, a trailing end, a longitudinal axis, and a lumen between said leading and trailing ends;

 a dilator at the leading end of said body being movable between an unexpanded position and an expanded position, said dilator having an inner surface, said dilator including a cell migration barrier formed between at least two different materials; and

 tissue retaining protrusions on said inner surface of said dilator, said tissue retaining protrusions being uniformly spaced around the longitudinal axis of said body.

40. (original) The surgical extractor of claim 39, wherein one of said materials is PTFE.

41. (original) The surgical extractor of claim 39, wherein one of said materials is polyester.

42. (original) The surgical extractor of claim 35, wherein said dilator includes a memory element configured to expand said dilator from the unexpanded position to the expanded position.

43. (previously presented) A surgical extractor for removing tissue from an animal or human body cavity, the extractor comprising:

 a body having a leading end, a trailing end, a longitudinal axis, and a lumen between said leading and trailing ends;

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a dilator at the leading end of said body being movable between an unexpanded position and an expanded position, said dilator having an inner surface and a memory element configured to expand said dilator from the unexpanded position to the expanded position, said memory element being along a circumference of said dilator; and

tissue retaining protrusions on said inner surface of said dilator, said tissue retaining protrusions being uniformly spaced around the longitudinal axis of said body.

44. (original) The surgical extractor of claim 43, wherein said memory element is positioned at a leading end of said dilator.
45. (original) The surgical extractor of claim 42, wherein said dilator includes memory elements parallel to the longitudinal axis when said dilator is in the unexpanded position.
46. (original) The surgical extractor of claim 42, wherein said memory element is adapted to expand said leading end of said dilator to an angle of at least 10 degrees from the longitudinal axis of said surgical extractor.
47. (original) The surgical extractor of claim 42, wherein said memory element is adapted to expand said leading end of said dilator to an angle of at least 20 degrees from the longitudinal axis of said body.
48. (original) The surgical extractor of claim 35, further comprising a retainer around at least a portion of said dilator for maintaining said dilator in the unexpanded position, said retainer being adapted to be removed from said dilator, thereby allowing said dilator to move to the expanded position.
49. (original) The surgical extractor of claim 35, wherein said dilator has a maximum diameter in the range of 3 mm to 5 mm in the unexpanded position.
50. (original) The surgical extractor of claim 35, wherein said tissue retaining protrusions are formed from a memory element.

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51. (original) A surgical extractor for removing tissue from an animal or human body cavity, the extractor comprising:
 - a body having a leading end, a trailing end, a longitudinal axis, and a lumen between said leading and trailing ends; and
 - a dilator at the leading end of said body being movable between an unexpanded position and an expanded position, said dilator having an inner surface made substantially of a first material and an outer surface made substantially of a second material, said first material of said inner surface having a coefficient of friction greater than a coefficient of friction of said second material of said outer surface.
52. (original) The surgical extractor of claim 51, wherein the coefficient of friction of said inner surface of said dilator is in a range from 0.5 to 0.9.
53. (original) The surgical extractor of claim 51, wherein said dilator includes a cell migration barrier formed between at said first and second materials.
54. (original) The surgical extractor of claim 51, wherein one of said materials is PTFE.
55. (original) The surgical extractor of claim 51, wherein one of said materials is polyester.
56. (original) The surgical extractor of claim 51, further comprising surface roughenings along said inner surface.
57. (original) The surgical extractor of claim 51, further comprising protrusions adapted to grab tissue without penetrating the tissue.
58. (previously presented) A surgical extractor for removing tissue from an animal or human body cavity, the extractor comprising:
 - a body having a leading end, a trailing end, a longitudinal axis, and a lumen between said leading and trailing ends;
 - a dilator at the leading end of said body being movable between an unexpanded position and an expanded position; and

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a retainer for restricting said dilator in the unexpanded position, said retainer being adapted to be removed from said dilator, thereby allowing said dilator to move to the expanded position, said retainer including a grip proximate said trailing end of said body for peeling open said retainer.

59. (original) The surgical extractor of claim 58, wherein said retainer comprises a polyurethane film.

Claim 60. (cancelled).

61. (original) A surgical extractor for removing tissue from an animal or human body cavity of a patient, the extractor comprising:

 a body having a leading end, a trailing end, a longitudinal axis, and a lumen between said leading and trailing ends;

 a dilator at the leading end of said body being movable between an unexpanded position and an expanded position, said dilator having a leading end;

 a cover at the leading end of said dilator adapted to capture the tissue prior to the extraction thereof from the patient; and

 a draw cable running through said lumen of said body, and having at least one loop at the leading end of said cover, said draw cable being adapted to draw in said cover upon moving said draw cable away from the trailing end of said body.

62. (original) The surgical extractor of claim 61, wherein said cover includes a hem enclosing at least a portion of said draw cable.

63. (original) The surgical extractor of claim 61, wherein said draw cable is adapted to run from said cover through said lumen of said body and lie beyond said trailing end of said body.

64. (original) The surgical extractor of claim 61, wherein said cover has a perimeter and a distal end of said draw cable is adapted to circumscribe the perimeter of said cover to form said at least one loop.

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65. (original) The surgical extractor of claim 64, wherein said draw cable is adapted to form a plurality of loops around the perimeter of said cover.
66. (original) The surgical extractor of claim 61, wherein said cover is made from a breathable material.
67. (previously presented) The surgical extractor of claim 61, wherein said cover is watertight.
68. (original) A method for removing tissue from an animal or human body cavity, the method comprising the steps of:
 - inserting a cannula into the cavity;
 - inserting a dilator into the cannula, the dilator having a leading end with a cover attached thereto, the cover having a draw cable adapted to draw in the cover;
 - expanding the leading end of the dilator to an expanded position;
 - moving the tissue into the dilator; and
 - drawing the draw cable.
69. (original) The method of claim 68, wherein the drawing step includes the step of drawing the draw cable to draw in the cover while the tissue is within the cavity.
70. (original) The method of claim 68, further comprising the step of dilating the cavity to remove the tissue.
71. (original) The method of claim 68, further comprising the steps of inserting a grasper through the cannula and grasping the tissue with the grasper to remove the tissue from the cavity.
72. (original) The method of claim 68, wherein the draw cable has a distal end attached to the cover and a proximal end lying outside the cannula, the pulling step including the sub-step of pulling the proximal end of the draw cable to draw in the cover.

Claims 73-76. (cancelled).

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77. (previously presented) A grasper for grasping tissue, the grasper comprising:
a shaft having a trailing end, a leading end, and a lumen therebetween, said lumen being configured to receive at least one surgical instrument; at least two grasping surfaces at said leading end configured to grasp tissue therebetween, said grasping surfaces including surface roughenings configured to generally point towards said trailing end of said shaft when said grasping surfaces are distanced apart from one another; and
a handle at said trailing end configured to operate said grasping surfaces.
78. (original) The grasper of claim 77, wherein said trailing end includes a depth-limiting protrusion for limiting the depth of insertion of said grasper into a cavity.
79. (original) The grasper of claim 77, wherein said lumen has an inside maximum cross sectional dimension in the range of 1 mm to 4mm.
80. (original) The grasper of claim 77, wherein said shaft has a length in the range of 15 cm to 35 cm.
81. (original) The grasper of claim 77, wherein said shaft has an outside maximum cross sectional dimension of less than 5 mm.
82. (original) The grasper of claim 77, further comprising at least a third grasping surface at said leading end.
83. (original) The grasper of claim 77, wherein said grasping surfaces include ridges to grasp the tissue.
84. (original) The grasper of claim 77, further comprising a seal oriented within said lumen of said grasper configured to permit the passage of a needle therethrough.
85. (original) The grasper of claim 84, wherein said seal includes a through-hole having smaller than the maximum cross sectional dimension of the surgical instrument.
86. (original) The grasper of claim 84, wherein said seal is adapted to inhibit a loss of pressure from within a patient after said grasper is inserted in the patient.

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Claims 87 and 88. (cancelled).

89. (previously presented) A method of removing tissue from an animal or human body cavity, the method comprising the steps of:
 - inserting a cannula into the body cavity;
 - inserting a dilator having a leading end through the cannula;
 - expanding the leading end of the dilator to an expanded position;
 - inserting a grasper having a passage into the body cavity;
 - suctioning fluid from the cavity through the passage of the grasper; and
 - grasping the tissue to remove the tissue from the cavity.
90. (original) The method of claim 89, further comprising the step of removing the cannula with the dilator remaining substantially in the expanded position.
91. (original) The method of claim 89, wherein the leading end of the dilator includes a draw cable for drawing in the leading end, further comprising the step of pulling the draw cable to draw in the leading end of the dilator.
92. (original) The method of claim 89, further comprising the step of removing the cannula with the dilator remaining substantially in the expanded position.

Claims 93-98. (cancelled).

99. (previously presented) The surgical extractor of claim 39, wherein said tissue retaining protrusions are teeth.
100. (previously presented) The surgical extractor of claim 39, wherein said tissue retaining protrusions are spaced substantially about the entire area of said inner surface.
101. (previously presented) The surgical extractor of claim 39, wherein said dilator includes a memory element configured to expand said dilator from the unexpanded position to the expanded position.
102. (previously presented) The surgical extractor of claim 101, wherein said dilator includes memory elements parallel to the longitudinal axis when said dilator is in the unexpanded position.

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103. (previously presented) The surgical extractor of claim 101, wherein said memory element is adapted to expand said leading end of said dilator to an angle of at least 10 degrees from the longitudinal axis of said surgical extractor.
104. (previously presented) The surgical extractor of claim 101, wherein said memory element is adapted to expand said leading end of said dilator to an angle of at least 20 degrees from the longitudinal axis of said body.
105. (previously presented) The surgical extractor of claim 39, further comprising a retainer around at least a portion of said dilator for maintaining said dilator in the unexpanded position, said retainer being adapted to be removed from said dilator, thereby allowing said dilator to move to the expanded position.
106. (previously presented) The surgical extractor of claim 39, wherein said dilator has a maximum diameter in the range of 3 mm to 5 mm in the unexpanded position.
107. (previously presented) The surgical extractor of claim 39, wherein said tissue retaining protrusions are formed from a memory element.
108. (previously presented) The surgical extractor of claim 43, wherein said tissue retaining protrusions are teeth.
109. (previously presented) The surgical extractor of claim 43, wherein said tissue retaining protrusions are spaced substantially about the entire area of said inner surface.
110. (previously presented) The surgical extractor of claim 43, wherein said memory element is adapted to expand said leading end of said dilator to an angle of at least 10 degrees from the longitudinal axis of said surgical extractor.
111. (previously presented) The surgical extractor of claim 43, wherein said memory element is adapted to expand said leading end of said dilator to an angle of at least 20 degrees from the longitudinal axis of said body.
112. (previously presented) The surgical extractor of claim 43, further comprising a retainer around at least a portion of said dilator for maintaining said dilator in the

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unexpanded position, said retainer being adapted to be removed from said dilator, thereby allowing said dilator to move to the expanded position.

113. (previously presented) The surgical extractor of claim 43, wherein said dilator has a maximum diameter in the range of 3 mm to 5 mm in the unexpanded position.

114. (previously presented) The surgical extractor of claim 43, wherein said tissue retaining protrusions are formed from a memory element.

115. (previously presented) The method of claim 89, wherein the step of inserting the cannula includes inserting a cannula having a maximum diameter in the range of 3 mm to 5 mm.

116. (previously presented) The method of claim 89, wherein the step of suctioning includes the step of suctioning bile or other material from a gall bladder.